



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,772	11/18/2002	Hwang Choe	24-NS-6042	2406
23465 7590 04/03/2007 JOHN S. BEULICK C/O ARMSTRONG TEASDALE, LLP ONE METROPOLITAN SQUARE SUITE 2600 ST LOUIS, MO 63102-2740			EXAMINER GREENE, DANIEL LAWSON	
			ART UNIT 3694	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		04/03/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/065,772	Applicant(s) CHOE ET AL.	
	Examiner Daniel L. Greene Jr.	Art Unit 3694	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-7,9,10 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-7,9,10 and 20-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/8/2007 has been entered.

Response to Arguments

2. Applicant's argument's, see page 5, filed 1/8/07, with respect to the section 4 rejection of the previous Office action mailed 11/06/2006 have been fully considered and are persuasive. The 35 USC 112 rejection set forth in section 4 of said previous Office action has been withdrawn.

3. Applicant's argument's, see pages 5-8, filed 1/8/07, with respect to the section 7 rejection of Church set forth in the previous Office action mailed 11/06/2006 have been fully considered and are persuasive as applicant has amended the claim language to overcome the physical structure of Church, i.e. coolant enters from the bottom of the reactor, etc. Accordingly the rejection set forth in said section 7 of said previous Office action has been withdrawn.

4. Applicant's argument's, see pages 8-9, filed 1/8/07, with respect to the section 8 rejection of Congdon set forth in the previous Office action mailed 11/06/2006 have

been fully considered and are persuasive as applicant has amended the claim language to overcome the physical structure of Congdon, i.e. Congdon does not appear to explicitly set forth a restriction device detachably coupled to the lower tie plate.

Although restriction devices, i.e. those that restrict particles from entering fuel assemblies are known to be attached in that location as will be addressed later within the instant Office action. Since Congdon by itself not appear to explicitly set forth a restriction device detachably coupled to the lower tie plate, the rejection set forth in said section 8 of said previous Office action is hereby withdrawn.

5. Applicant's arguments regarding section 9 of said previous Office action, have been fully considered but they are not persuasive and are expounded upon more fully in the section of 35 USC 103 rejections below.

6. Applicant's argument's, see pages 13-15, filed 1/8/07, with respect to the section 10 rejection set forth in the previous Office action mailed 11/06/2006 have been fully considered and are persuasive as applicant has amended the claim language to overcome the physical structure. Accordingly the rejection set forth in said section 10 of said previous Office action has been withdrawn.

7. Applicant's argument's, see pages 15-18, filed 1/8/07, with respect to the section 11 rejection set forth in the previous Office action mailed 11/06/2006 have been fully considered and are persuasive as applicant has amended the claim language to overcome the physical structure. Accordingly the rejection set forth in said section 11 of said previous Office action has been withdrawn.

8. Applicant's argument's, see pages 18-20, filed 1/8/07, with respect to the section 12 rejection of Church set forth in the previous Office action mailed 11/06/2006 have been fully considered and are persuasive as applicant has amended the claim language to overcome the physical structure. Accordingly the rejection set forth in said section 12 of said previous Office action has been withdrawn.

Drawings

9. The drawing (Fig. 3) received 1/8/2007 appears satisfactory.

10. However, the drawings are now objected to under 37 CFR 1.83(a), because the drawings must show every feature of the invention specified in the claims. Therefore,

- a. **the means in which each said restriction device is detachably coupled** to a lower end of the lower tie plate as set forth in claim 1,
 - b. **the coolant orifices** set forth in claims 1, 3, 4, etc., and
 - c. **the restriction devices** set forth in claims 1, 9, 10, etc.
- must be shown or the feature(s) canceled from the claim(s).** No new matter should be entered.

It appears Applicants drawings Figure 3 attempts to set forth the limitations in question, however a review of said figure 3 shows it clearly lacking in setting forth exactly what applicant is attempting to claim. Accordingly, applicant is required to disclose exactly how and in what manner said coolant orifices and restriction devices are attached and what they look like, that is, the orifices, restriction devices and means of detachable coupling.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

11. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the manner in which the each of the restriction devices is detachably coupled to a lower end of the lower tie plate as described in the specification in, for example, paragraph [0011], . Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the

sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 1, 3, 7, 9, 10 and 20-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a. There is no proper antecedent basis for "said coolant inlet" and "fuel bundle main body" in claim 1.
- b. Claim 1 is vague, indefinite and incomplete in what all is meant by and encompassed by the phrase "each said coolant orifices located in said inlet of

said main coolant flow channel” because it is unclear whether each inlet contains one orifice or a plurality of orifices. Since the disclosure only sets forth that each inlet contains only one orifice the metes and bounds of the claim are undefined.

c. Claim 1 is vague, indefinite and incomplete in what all is meant by and encompassed by the phrase “a plurality of coolant orifices” because the drawings fail to show and the specification fails to disclose exactly what a coolant orifice is. Accordingly the metes and bounds of the claim are undefined.

d. Claim 1 is vague, indefinite and incomplete in what all is meant by and encompassed by the phrase “a plurality of restriction devices” because the drawings fail to show and the specification fails to disclose exactly what restriction devices are. Accordingly the metes and bounds of the claim are undefined.

e. Claim 1 is vague, indefinite and incomplete in what all is meant by and encompassed by the phrase “detachably coupled” because the drawings fail to show and the specification fails to disclose exactly what detachably coupled means. Since there are many ways something may be detachably coupled, e.g. cutting with a welding torch, held together by springs, held by latches, etc. the metes and bounds of the claim are undefined.

f. Claim 3 is vague, indefinite and incomplete in what all is meant by and encompassed by the phrase “are sized so that the flow of coolant...in a particular region are substantially the same”. This contains several problems, first are all the orifices located in a particular region sized substantially the same or is all of

the flow in a particular region substantially the same. The claim is not proper English in that the claim recites "are" substantially the same which appears to refer back to the orifices. Accordingly the metes and bounds of the claim are undefined.

g. Claim 3 is vague, indefinite and incomplete in what all is meant by and encompassed by the phrase "the flow of coolant through said main coolant flow channels are substantially the same" because the claim fails to take into account the higher pressure of water near the output of the jet pumps. It is not seen wherein applicant has accounted for this differentiation in pressure hence the metes and bounds of the claim are undefined.

h. All other dependent claims not expressly recited herein are rejected for their dependency on a rejected base claim.

Claim Rejections - 35 USC § 103

14. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

15. Claims 1 to 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Patterson (U.S. Patent 3,892,625) in view of JP 06-289178 (Yasuyaki) for the reasons set forth in section 9 of the previous office action mailed 11/06/2006.

Applicant's arguments have been fully considered but they are not persuasive.

Resort will be had to Figure 2 to set forth the structural limitations

Applicant is arguing Patterson does not have.

First, the Examiner would like to point out that after further consideration it has been determined that Patterson does indeed set forth three core flow regions because as shown by Figure 2 below, the flow through EACH radial blanket fuel assembly the examiner has labeled as 1, 2 and 3 will indeed be different due to the different size of the orifice that lets water into each said fuel assembly.

Second, as clearly indicated by the Examiner, each radial blanket fuel assembly does indeed have its own restriction device that is indeed detachably coupled to the lower end of the lower tie plate as the limitation "detachably coupled" is encompassed by using a cutting torch to detach said restriction devices from the lower tie plate as evidenced by the words "cut along dotted line to detach restriction device"

CUT ALONG DOTTED LINE TO DETACH
RESTRICTION DEVICE

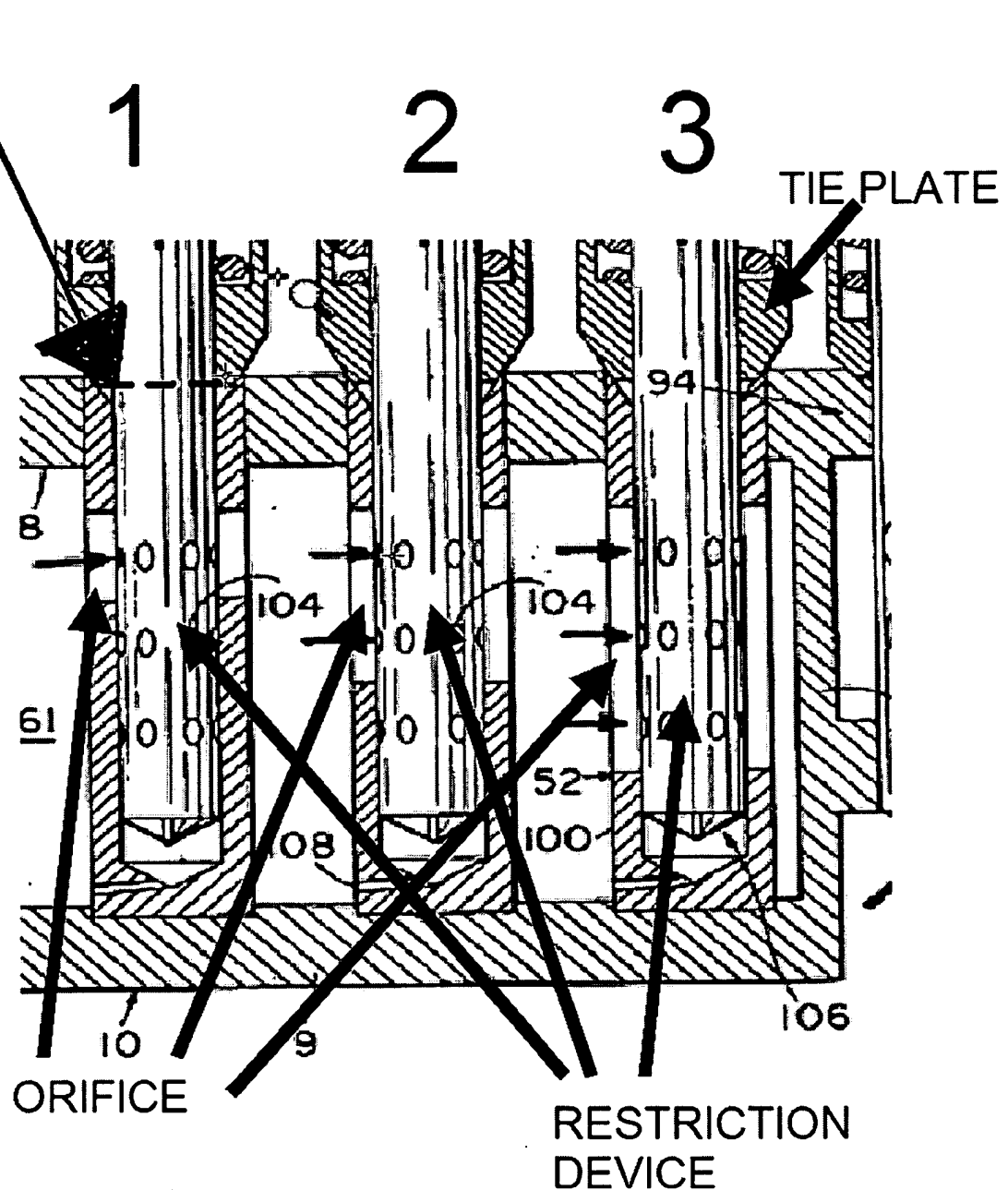


Fig. 2

Indeed, it appears some of the issues with determining exactly what Applicant is attempting to claim is due to the failure of the drawings to show exactly what applicant's invention is. However the limitation "detachably coupled" is really an intended use or how the applicant would like the restriction device to be attached. There is nothing that would prevent anyone from cutting off the restriction devices of Patterson, that is to make them detachably attached.

Yasuyaki was cited to show flow through three regions of the core was obvious to do and as such was simply redundant because, as set forth above, Patterson does indeed set forth three different flow rates controlled by orifices of three different sizes.

16. Claims 1, 3-7, 9, 10 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art (APA) in view any of Congdon et al. Patterson or Yasuyaki and further in view of either U.S. Patent 5,384,814 to Matzner et al. OR U.S. Patent 5,524,031 to Kilian.

Applicant's APA substantially discloses, in paragraphs 2-8 of the specification as filed, specifically paragraph 7, applicant's invention as claimed including the use of fuel element "inlet" orifices to create different zones/regions of substantially the same flow rate, and that the main coolant flow enters the lower tie plate of the fuel assembly. Paragraph 7 explicitly sets forth "the flow enters the inlet to the fuel support. The flow then passes **through an orifice**" APA does not appear to explicitly disclose the use of more than 2 regions of

different coolant flow, or that the restriction devices are "detachably coupled" to a lower end of said lower tie plate.

Although APA does not appear to set forth more than 2 regions of flow, resort may be had to case law to show it is obvious on its face that the "Mere duplication of parts has no patentable significance unless new and unexpected result is produced "See, *In re Harza*, 124 USPQ 378 (CCPA 1960) In this case there is no new or unexpected result, merely the addition of another region of flow. Any of Congdon et al. Patterson or Yasuyaki can also be relied upon to show it is well known in the nuclear art to have three or more regions of flow within a reactor.

Either Killian or Matzner can be relied upon to show it is well known in the nuclear art to detachably couple restriction devices to a lower end of the lower tie plate of a nuclear fuel assembly for the benefits of, for example, providing particulate restriction (also known in the art as filtration) to fuel assemblies that were not manufactured with such particle restriction devices thus preventing particulate from entering the fuel assemblies. Since these particulate restriction devices inherently have a pressure drop associated with their installation, they inherently control a flow of coolant within the main coolant flow channel.

At the time of the invention it would have been obvious to one of ordinary skill in the art to have included the debris filters set forth in either Killian or Matzner in the fuel assemblies of the APA for the benefits of preventing debris

from entering said fuel assemblies and thus preventing the ensuing damage that said debris would cause as well as the other benefits disclosed therein.

The limitations of the dependent claims are set forth in the rejection of corresponding parts above wherein at least APA, Congdon et al. Patterson AND Yasuyaki all set forth the use of different sized orifices to control flow to different regions of the core and which orifices are used to control which region as set forth in the claims.

17. Claims 1, 3-7, 9, 10 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Congdon et al. in view of either U.S. Patent 5,384,814 to Matzner et al. OR U.S. Patent 5,524,031 to Kilian.

Congdon discloses a nuclear reactor core comprising a plurality of fuel assemblies (130), each said fuel assembly inherently comprising a lower tie plate (because lower tie plates are known in the art as being utilized to hold each individual fuel rod in place to constitute a fuel assembly) and a main coolant flow channel comprising an inlet and a coolant flowing through said plurality of fuel assemblies (Figure 1) said plurality of fuel assemblies arranged into at least three regions (Figure 2) within said core, each said main coolant flow channel further comprising a detachably coupled to the lower end of the lower tie plate of the fuel assembly separate means (242, 244, 246, 126, etc.) of controlling a flow of coolant through said main coolant flow channel so that the flow of coolant through said main coolant flow channels of said fuel assemblies located in a particular region are substantially the same, and that the coolant flow through

said fuel assemblies in each said region is different from the coolant flow through said fuel assemblies in each other region, said means of controlling said flow of coolant through said main coolant flow channel located in said inlet of said main coolant flow channel, in for example, the abstract, figures 1 and 2, column 4 lines 17-19, 26-43, column 5 lines 14-40, Claims 1-6, etc.

Congdon discloses the flow rates, sizes, shapes, numbers, arrangements of the holes/orifices as set forth in applicant's claims in, for example, column 5 lines 13-25.

Congdon does not appear to expressly disclose a restriction device detachably coupled to a lower end of the lower tie plate.

Either Killian or Matzner can be relied upon to show it is well known in the nuclear art to detachably couple restriction devices to a lower end of the lower tie plate of a nuclear fuel assembly for the benefits of, for example, providing particulate restriction (also known in the art as filtration) to fuel assemblies that were not manufactured with such particle restriction devices thus preventing particulate from entering the fuel assemblies. Since these particulate restriction devices inherently have a pressure drop associated with their installation, they inherently control a flow of coolant within the main coolant flow channel.

At the time of the invention it would have been obvious to one of ordinary skill in the art to have included the debris filters set forth in either Killian or Matzner in the fuel assemblies of the Congdon for the benefits of preventing debris from entering said fuel assemblies and thus preventing the ensuing

Art Unit: 3694

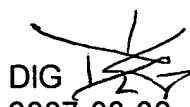
damage that said debris would cause as well as the other benefits disclosed therein.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel L. Greene Jr. whose telephone number is (571) 272-6876. The examiner can normally be reached on Mon-Fri 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James P. Trammell can be reached on (571) 272-6712. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DIG 
2007-03-30



**MARY D. CHEUNG
PRIMARY EXAMINER**